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NEW SPECIES OF *ERYTHROXYLUM* FROM BRAZIL AND VENEZUELA

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Erythroxylum Leal-costae Plowman, *E. occultum* Plowman and *E. hypoleucum* Plowman are described and illustrated, and their ecology and taxonomic relationships discussed. *Erythroxylum Leal-costae* and *E. occultum* are known only from urban areas in Brazil and are pointed out as endangered species.

As a result of taxonomic studies of the genus *Erythroxylum* in preparation of a treatment for *Flora Neotropica*, numerous undescribed species have been discovered, particularly from Brazil and Venezuela. A number of these are known only from urban areas and other environments rapidly undergoing habitat destruction. It is the purpose of this paper to call attention to two of these species from Brazil—*E. Leal-costae* from Salvador, Bahia, and *E. occultum* from Rio de Janeiro—in order to underscore their endangered status.

Erythroxylum (sect. *Rhabdophyllum*) **Leal-costae** Plowman, *sp. nov.*

Frutex dense ramosus. Ramuli crassi et rigidi. Stipulae coriaceae, persistentes, striatae, 3–setulosae. Folia ad apices brachyblastorum producta, brevissime petiolata; laminae ellipticae vel late obovatae, apice rotundatae, retusae vel emarginatae, coriaceae. Flores fasciculati in axillis foliorum a brachyblastis hornotinis producti, pedicello brevi et incrassato. Petali lamina concava, late ovata. Urceolus stamineus quam calyx paulo longior, ad marginem 10–denticulatus. Drupa anguste ovoidea, endocarpio subtereti, dorsaliter 3–sulculato, apice acuto, ad maturitatem uniloculari, endospermio abundanti.

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SHRUB or TREELET to 3 m. tall with dense, spreading crown and single trunk to 6 cm. in diameter. BARK on trunk rugose, fissured transversely and longitudinally into rectangular segments, whitish grey to dark brown, 7–10 mm. thick; inner bark reddish brown; wood pale reddish tan. BRANCHES spreading, diffuse, terete, dark to light grey. BRANCHLETS distichous, divaricating at wide acute to right angles, straight or somewhat curved toward apex, thick, rigid, strongly flattened toward apex, 3–4 mm. wide, 2 mm. thick, initially light green, turning dark grey and drying blackish, smooth or somewhat longitudinally wrinkled, the lenticels sparse, punctate to briefly elongate, whitish. INTERNODES 5–20 mm. long on long shoots, highly contracted and ca. 1 mm. long on short shoots. RAMENTA congested at base of longer shoots 5–25 mm. along stem or covering short shoots, black. STIPULES persistent, appressed, diverging to ca. 45° with age, broadly triangular-ovate, 2.0–3.5 mm. long, coriaceous, light green, turning black with age, distinctly striate when young with 3–5 nerves per side, apically obtuse to truncate, 3–setulose, the setae 0.6–1.0 mm. long, very fragile and early disappearing, the keels prominulous, subulate, the margin entire. LEAVES deciduous, 2–3 produced at tips of branchlets, distichous, very short petiolate, the lamina stiff, held erect, plane or nearly so, elliptic to obovate, sometimes orbicular, apically rounded, retuse or emarginate, basally obtuse or rounded, 30–60 mm. long, 20–45 mm. wide, coriaceous, medium to dark green adaxially, light yellowish green abaxially, drying ferrugineous, shiny to rather dull adaxially, dull abaxially, elineate and without a distinct central panel, the midrib slightly raised, acute in cross section, yellowish adaxially, drying ferrugineous abaxially, the lateral nerves 7–11, straight, diverging 40°–75° from midrib, prominulous to obscure adaxially, abaxially distinct, darker green than lamina, the veinlets abaxially distinct, finely reticulate. PETIOLE short, thick, 1.0–2.5 mm. long, 1.5–2.0 mm. in diameter, subterete, dark brown, drying black. FLOWERS in axillary fascicles on current season's shoots, often congested near apex of short shoots, with 1–6 flowers per node; flower color unknown. BRACTEOLES 3 per flower, sub-

orbicular to triangular, 0.8–1.0 mm. long, membranaceous, apically obtuse to rounded, with one submedial nerve, 1–setulose, the seta 0.1–0.3 mm. long. PEDICEL short, thick, pentangular, 1.5–2.0 mm. long, 1.0–1.5 mm. in diameter. CALYX 1.5–2.0 mm. long, the lobes triangular to broadly ovate, 1.0–1.2 mm. long, apically acute to acuminate, the apex itself obtuse. PETAL limb suberect, concave, broadly ovate in outline, 2 mm. long, 1.5–1.7 mm. wide, rounded at apex, the claw 1 mm. long, the ligule 1.0–1.1 mm. long, bilobate, the lobes with one larger posterior and one smaller anterior lobule, erose at margin, 0.7 mm. long. STAMINAL CUP 1.0–1.5 times as long as calyx, 1.2–1.5 mm. long, 10–denticulate at margin; anthers broadly ovate, apically rounded. BRACHYSTYLOUS FLOWERS: filaments 2.1–2.2 mm. long, the anthers 1.6 mm. long; styles free, 0.8–1.0 mm. long, the stigma broadly depressed-capitate, 1 mm. in diameter, 0.6 mm. thick. DOLICHOSTYLOUS FLOWERS: antesepalous filaments 0.7–1.0 mm. long, the anthers 0.5 mm. long; antepetalous filaments 0.8–1.5 mm. long, the anthers 0.5 mm. long; styles free, 1.3 mm. long; stigma not seen. OVARY not seen. DRUPE narrowly ovoid, apically obtuse, 9–10 mm. long, 4 mm. in diameter, yellowish orange at maturity (*fide Carvalho et al.*), the mesocarp ca. 0.3 mm. thick, the endocarp narrowly ovoid, apically acute, subterete, dorsally shallowly 3–sulculate, unilocular at maturity; endosperm occupying ca. 2/3 of endocarp. EMBRYO 6.5–7.0 mm. long; cotyledons oblong-obovate, plane, 4.2–5.5 mm. long, 3.0–3.2 mm. wide, 1 mm. thick, apically rounded; radicle 1.7–1.8 mm. long.

TYPE: BRAZIL: STATE OF BAHIA: Salvador, entre o Aeroporto e o Stella Maris, Dunas de Itapuã, 23 Mar 1975(fl, fr), *A. Leal Costa s.n.*! (HOLOTYPE, ALCB; ISOTYPE, F 1871789).

ADDITIONAL SPECIMENS EXAMINED: BRAZIL: BAHIA: Município de Salvador. Along road (Av. Otávio Mangabeira = BA–033) from Itapuã to Aeroporto 2 de Julio at first large traffic circle (intersection with Av. Luiz Viana Filho), approx. 12°55′S., 38°21′W., near sea level, 23 May 1981 (young fr), *A. M. de Carvalho et al. 705* (CEPEC, F), 27 Jan 1983 (st), *T. Plowman 12770* (CEPEC, F, 14 duplicates to be distributed); 27 Jan 1983

(st), *T. Plowman 12780* (CEPEC, F, four duplicates to be distributed).

ETYMOLOGY: *Erythroxylum Leal-costae* is named in honor of Dr. Alexandre Leal Costa, dedicated collector of the flora of Bahia who first collected the species in 1975.

DISTRIBUTION: Known only from the type locality in an extremely limited area.

ECOLOGY: *Erythroxylum Leal-costae* is confined to a small area within a region of dune scrubland near the town of Itapuã next to the airport of the city of Salvador, Bahia. This vegetation is included in the broad concept of "restinga" but has been described by Eiten (1968) as "evergreen broadleaf open clumped scrub." The restinga of Itapuã consists mainly of evergreen shrubs and small trees with dense, tortuous branches and coriaceous, evergreen leaves, including *Guettarda platypoda* DC., *Kielmeyera argentea* Choisy, *Croton Sellowii* Baill., *Emmotum affine* Miers, *Ternstroemia* sp., and several Myrtaceae. A recent study of plant dispersal and succession at this site (Morawetz, in press) listed 94 species in some 84 genera and 51 families, but this *Erythroxylum* apparently was overlooked. A number of other species are thought to be endemic at the restinga of Itapuã, including *Aechmea itapoana* W. Till & Morawetz, *Hyptis Blanchetii* Benth., and possibly *Kielmeyera reticulata* Saddi.

PHENOLOGY: Flowering material of *Erythroxylum Leal-costae* has been collected in late March and fruiting specimens in May.

COMMON NAMES AND USES: No common names or uses are reported for this species.

RELATIONSHIPS: *Erythroxylum Leal-costae* appears to be-long to Sect. *Rhabdophyllum* based on its having striated stipules, but its relationships within this large and diverse group are uncertain. *Erythroxylum Leal-costae* may be related to two other restinga species also occurring in Bahia: *E. passerinum* Mart. and an undescribed species (*Plowman & Carvalho 12795*). These two species are easily distinguished from *E. Leal-costae* by having more slender branchlets (ca. 2 mm. diameter), chartaceous leaves and longer pedicels (5–8 mm. long). Superficially, *E. Leal-costae* resembles several species of Sect. Archerythroxylum occurring in Brazilian restingas and related habitats, including *E. ovalifolium*

Peyr., *E. nitidum* Spreng. and *E. hypoleucum* Plowman. These may all be readily distinguished from *E. Leal-costae* by their lack of stipular striations.

Erythroxylum (sect. *Archerythroxylum)* **occultum** Plowman, *sp. nov.*

Arbor parva. Trunci cortex griseus, longitudinaliter et transversaliter profunde fissuratus. Ramuli recti, lenticellis abundanter producti. Stipulae persistentes, estriatae, nigrescentes, leviter fimbriatae, 3–setosae. Folia persistentia, breviter petiolata; laminae ellipticae vel oblongae, apice retusae, margine undulatae, basi cuneatae, chartaceae, elineatae. Flores 1–2 in axillis ramulorum hornotinorum producti, pedicellati. Petali lamina plus minusve plana, oblongo-elliptica. Urceolus stamineus quam calyx paulo brevior, ad marginem integer. Drupa oblongo-ellipsoidea, apice rotundata, rubra, endocarpio oblongo-ellipsoideo, 6–sulcato, ad maturitatem uniloculari.

TREE to 12 m. tall, with trunk reaching 35 cm. in diameter (*fide* Coimbra). BARK on trunk of young tree roughish, irregularly finely mottled with corky warts and fissures, dark reddish brown; in mature tree deeply fissured transversely and longitudinally forming quadrangular plates, dark grey (*fide* Coimbra). BRANCHES ascending, spreading, somewhat storied, terete, brown. BRANCHLETS distichous, consisting mainly of long shoots, straight, diverging 45°–60° from axis, flattened toward apex, 1.5–2.0 mm. in diameter, reddish brown, turning dark brown or dark grey with age, covered with numerous punctate or briefly elongate whitish lenticels. INTERNODES 2–18 mm. long. RAMENTA produced briefly at base of shoots for 5–8 mm. along stem, equaling the stipules. STIPULES persistent, appressed, somewhat incurved with age, oblong to narrowly ovate, 1.2–2.3 mm. long, firmly membranaceous, estriate, pale green, turning dark brown or black with age, apically rounded to truncate, 3–setose, the setae subfilamentose, early caducous, the 2 lateral setae 1 mm. long, the medial seta 0.5–0.8 mm. long, the keels slender, filamentose when young, the margin fimbriate when young, becoming entire and somewhat involute with age. LEAVES persistent, scattered on longer branchlets or 2–3 produced near

apex of shorter branchlets, distichous, petiolate, the lamina plane or somewhat undulate, elliptic to oblong, rarely oblong-obovate or lanceolate, apically retuse, strongly undulate at margin, basally cuneate, 25–55 mm. long, 15–25 mm. wide, chartaceous, medium green adaxially, pale green abaxially, somewhat shiny adaxially, dull abaxially, elineate, the central panel abaxially faintly demarcated by more prominent and more densely reticulate veinlets, the adaxial midrib slightly raised, slender, narrowly acute in cross section, yellowish green, the lateral nerves 8–11 per side, rather straight or arcuately curved, diverging 55°–80° from midrib, prominulous adaxially, prominulous to obscure abaxially, the veinlets finely reticulate, distinct to rather obscure. PETIOLE 1.5–3 mm. long, 0.4–0.8 mm. in diameter, green, drying dark brown, semi-circular in cross section, adaxially canaliculate. FLOWERS 1–2 in axils of mature current season's twigs, more or less scattered, the flower color unknown. BRACTEOLES 3 per flower, small, broadly triangular, 0.5–0.6 mm. long, membranaceous, early disintegrating, apically obtuse to acuminate, 1–setulose, the seta 0.5 mm. long, early caducous. PEDICEL slender, pentangular, 5–6 mm. long, 0.7–0.8 mm. in diameter. CALYX 1.5 mm. long, deeply divided, the lobes ovate, 1.0–1.3 mm. long, apically obtuse to short acuminate with an obtuse acumen. PETAL LAMINA spreading, more or less plane, oblong-elliptic, rounded at apex, 2.0 mm. long, 1.5 mm. wide, the claw 0.5 mm. long, the ligule 0.9 mm. long, trilobulate with 2 longer lateral lobes and 1 shorter medial lobe, the lobes broadly ovate, apically rounded. STAMINAL CUP about 3/4 the length of calyx, 0.7 mm. long, the margin entire. BRACHYSTYLOUS FLOWERS: filaments 2.0–2.5 mm. long; anthers not seen; styles free, 1 mm. long, reflexed in young fruit; stigma depressed-capitate, 0.3 mm. long. DOLICHOSTYLOUS FLOWERS: not seen. OVARY: not seen. DRUPE oblong-ellipsoid, rounded at apex, 11–14 mm. long, 7–8 mm. in diameter, red at maturity (*fide* Coimbra), the mesocarp 0.3–0.8 mm. thick, the endocarp oblong-ovoid, 6–sulcate, unilocular, the endosperm occupying about 1/2 of locule; some fruits abnormal, gall-infested. EMBRYO 9 mm.

long; cotyledons elliptic, flattened, apically rounded, basally subcordate, 8 mm. long, 4.8 mm. wide, 1 mm. thick; radicle 1.8 mm. long, terete.

TYPE: BRAZIL: STATE OF RIO DE JANEIRO: City of Rio de Janeiro. Matta do Horto Florestal. Árvore de 8–12 m. de altura. Matta. 28 Dec 1926 (fr), *Pessoal do Horto Florestal s.n., Herbario do Serviço Florestal do Brasil 223* (HOLOTYPE, RB 4842; ISOTYPES, RB 4842, 4 sheets; F 1875198, 3 isotypes to be distributed).

ADDITIONAL SPECIMENS EXAMINED: BRAZIL: RIO DE JANEIRO: City of Rio de Janeiro, Alto do Boa Vista, Estrada da Vista Chinesa, Centro de Botânica FEEMA-DECAM, cultivated in front of herbarium building, 26 Feb 1983 (st), *T. Plowman 12952* (F, GUA, RB, 3 duplicates to be distributed). This tree was originally discovered growing in the forest margin at the Parque da Cidade (Parque Federal da Gávea) in the city of Rio de Janeiro by Adelmar Faria Coimbra Filho who collected seeds for propagation and distribution at the former Instituto da Conservação da Natureza of the city of Rio de Janeiro.

ETYMOLOGY: From Latin "occultus," meaning "hidden," "concealed" or "secret." The name refers to the fact that this species had been overlooked previously by botanists, apparently due to its rarity.

DISTRIBUTION: *Erythroxylum occultum* is known only from the city of Rio de Janeiro.

ECOLOGY: This species grows in the moist tropical forests that surround the city of Rio de Janeiro. A. F. Coimbra Filho (pers. comm.), who introduced *E. occultum* into cultivation, asserts that it is an exceedingly rare species which may be in danger of extinction if it is in fact confined to the environs of the city of Rio. However, it may occur elsewhere in the Serra do Mar region and have been overlooked by collectors because of its rather small, inconspicuous flowers and possibly short flowering period.

PHENOLOGY: The only known fertile collection was made in late December. The tree cultivated at the Centro de Botânica in Rio (*Plowman 12952*) was 6 m. tall in 1983 and at least 15 years old but has never been observed to flower.

COMMON NAME: "Arco-de-pipa," a name that is also applied to *Erythroxylum pulchrum* St. Hil., a common tree species around Rio de Janeiro.

RELATIONSHIPS: *Erythroxylum occultum* belongs to section *Archerythroxylum*, a group that is well represented in southeastern Brazil with more than 20 species. Whereas its specific relationships are less clear, it appears to be related to both *E. vacciniifolium* Mart. (including *E. amplifolium* [Mart.] O. E. Schulz) and *E. cuspidifolium* Mart. (including *E. exaltatum* Bong. ex Peyr.), shrubs or small trees occurring in montane forests and restingas of the Serra do Mar. *Erythroxylum vacciniifolium* differs from *E. occultum* in having plane, more coriaceous leaves with dense and prominent venation, ramenta much larger than the stipules, coriaceous and up to 5 mm. long, a denticulate staminal cup and a smaller fruit (8–11 mm. long vs. 11–14 mm. long). *Erythroxylum cuspidifolium* differs in having larger (50–120 mm. long), apically acuminate leaves, smooth stipules, and flowers produced in dense fascicles at the tips of short shoots. *Erythroxylum occultum* also may be confused with species that have been placed in closely related sections (*fide* Schulz, 1907) and that also occur in the environs of the city of Rio de Janeiro. It differs from *E. cryptanthum* O. E. Schulz (sect. *Megalophyllum*) in having much smaller leaves (25–55 mm. vs. 50–105 mm. long), fimbriate stipules and longer pedicels (5–6 mm. vs. 2–3 mm. long); from *E. cincinnatum* Mart. (sect. *Microphyllum*) in its arborescent habit and in having the leaves dull on the lower surface, fimbriate stipules, more lax and fewer ramenta, longer pedicels (5–6 mm. vs. 1–2 mm. long) and an entire staminal cup; and from *E. pulchrum* St. Hil. (sect. *Leptogramme*) in having smaller leaves (25–55 mm. vs. 65–112 mm. long), shorter (1.2–2.3 mm. vs. 4–5 mm. long), fimbriate stipules and fewer flowers per node (1–2 vs. 6–20).

Erythroxylum (sect. *Archerythroxylum*) **hypoleucum** Plowman, *sp. nov.*

Arbor parva ramulis crassis griseis, innovationibus cera vestitis. Stipulae subcoriaceae, persistentes, estriatae, minute 2–setulosae. Folia breviter petiolata; laminae ellipticae, oblongae vel

obovatae, apice rotundatae retusae, coriaceae, supra viridia, subnitidae, subtus albae. Flores subsessiles, fasciculati in axillis foliorum vel ramentorum a ramulis annotinis producti, pedicello brevissimo crasso. Petali lamina concava, late ovata. Urceolus stamineus calyce dimidio brevior vel calycem aequans, ad marginem integer. Drupa ellipsoidea, endocarpio ellipsoideo-fusiformi, 6–sulcato, triloculari, loculis sterilibus 2, loculo fertili 1 cruciformi in sectione traversali, embryone valde compresso, cotyledonibus oblongo-ovatis.

Small TREE to 8 m. tall. TRUNK to 10 cm. in diameter with red inner bark. BRANCHES terete, grey to greyish brown, rather smooth, sometimes with warty "knobs" at intervals (remnants of past inflorescences). BRANCHLETS weakly distichous, consisting of both long and short shoots but not strongly dimorphic, diverging at 45°–75° from axis, somewhat flattened toward apex, thick, rather rigid, 2.5–4 mm. in diameter, reddish brown, covered with a waxy coating when new, sparsely provided with small, punctate, whitish lenticels, with age becoming light to dark grey or greyish brown. INTERNODES 2–14 mm. long on long shoots, 1–3 mm. long on short shoots. RAMENTA absent or sparse, when present appearing at base of long shoots 7–10 mm. along axis, ca. 2.5 mm. long, black. STIPULES persistent but wearing away with age, appressed to stem and spreading with age, covered with waxy coating when new, triangular to ovate, 2–4 mm. long, subcoriaceous, estriate, light green, turning black with age, apically obtuse to acutish, minutely 2–setulose, the setae 0.2–0.3 mm. long, early caducous and rarely observed, the keels sub-alate, minutely fimbriate, some becoming entire, the margins minutely fimbriate, becoming entire with age. LEAVES persistent, scattered on long shoots or 1–3 produced at tips of branchlets, distichous, short petiolate, the lamina plane, elliptic to oblong or broadly obovate, apically rounded and shallowly retuse, with a minute black punctate mucron, revolute at margin, rounded to broadly cuneate at base, 40–90 (155) mm. long, 27–55 (70) mm. wide, subcoriaceous to coriaceous, adaxially light to dark green, sometimes glaucescent or slightly shiny, abaxially whitish or silvery, matt, bilineate with one distinct lateral line 5–8 mm. from each side of midrib, the central panel weakly distinct,

sometimes darker in color and with less prominent venation, the midrib flat and slightly impressed on adaxial surface, the lateral nerves 11–15 per side, straight or somewhat sinuous, diverging 45°–70° from midrib, prominent on both surfaces, the veinlets irregularly reticulate, sometimes obscure on upper surface. PETIOLE 3–6 (8) mm. long, 1.5–2 mm. in diameter, covered with a waxy coating when young, subterete, adaxially canaliculate, subalate at margin. FLOWERS subsessile in axillary fascicles in axils of ramenta or leaves on past seasons' branchlets, with 2–5 flowers per node; petal lamina greenish with white margins, the ligule and filaments white. BRACTEOLES 3 per flower, triangular to broadly ovate, 0.5–1.2 mm. long, firmly chartaceous, apically obtuse to acutish, minutely 1-setulose, persisting and giving older branchlets a warty appearance. PEDICEL very short, thick, weakly pentangular, 0.3–0.8 mm. long, 0.5–1.0 mm. in diameter. CALYX subcoriaceous, 1.5–2.0 mm. long, divided 1/2 to 3/4 its length, the lobes ovate to triangular-ovate, acute to short acuminate at apex, 1.0–1.5 mm. long. PETAL LAMINA spreading or suberect, shallowly cymbiform to concave, broadly ovate in outline, apically obtuse to broadly rounded, 1.5–2.3 mm. long, 1.0–1.5 mm. wide, the claw 0.7–1.2 mm. long, the ligule 0.8–1.2 mm. long, consisting of 2 longer posterior lobes with a short basal thickening between them and 2 short anterior lobes. STAMINAL CUP half as long to nearly equaling the calyx, 0.5–1.2 mm. long, entire at margin; anthers suborbicular, basally cordate. BRACHYSTYLOUS FLOWERS: filaments 1.8–2.0 mm. long, the anthers 0.5 mm. long; styles free, 0.7–0.8 mm. long, deflexed somewhat after anthesis; stigma depressed-capitate, 0.3 mm. long. DOLICHOSTYLOUS FLOWERS: antesepalous filaments 0.4–0.5 mm. long, the anthers slightly smaller, 0.3–0.4 mm. long; styles free or coherent briefly at base, erect, 2.0–2.5 mm. long; stigma erect, depressed-capitate, 0.3 mm. long. OVARY ellipsoid-oblongoid, rounded to somewhat truncate at apex, slightly longer than staminal cup, 1.3–1.5 mm. long. DRUPE ellipsoid, apically obtuse to rounded, 7.5–8 mm. long, 3.0–4.5 mm. in diameter, dark red at maturity, the mesocarp to 0.5 mm. thick, the endocarp ellipsoid-fusiform, 6-sulcate, 3-locu-

lar at maturity, with 2 empty and 1 fertile locules, the fertile locule cruciform in cross section, the endosperm occupying about 3/4 of fertile locule. EMBRYO strongly compressed, green, 5.5 mm. long; cotyledons oblong-ovate, apically rounded, 3.3 mm. long, 1.4 mm. wide, 0.2 mm. thick; radicle 2.5 mm. long.

TYPE: VENEZUELA: Territorio Federal Amazonas: 1 km. al este de Maroa, sabana de arena blanca y bosque enano, Lat. 2°45′N., Long. 67°35′W., alt. 125 m., small shrub 3 m. tall; leaves subcoriaceous, deep green above, silvery below; flowers greenish white. 20 Apr 1970 (fl), *J. A. Steyermark et G. Bunting 102807* (HOLOTYPE, F 1848445; ISOTYPES, MO 2685581, VEN).

ADDITIONAL SPECIMENS EXAMINED: VENEZUELA: BOLÍVAR: Cumbre del Cerro Guaiquinima, a lo largo del afluente del río Carapo, 1 km. río arriba del Salto Szczerbanari, 5°44′4″ N., 63°41′8″ W., parte suroriental del cerro, alt. 730–750 m., 23–24 May 1978 (fr), *J. A. Steyermark et al. 117224* (F, VEN). TERRITORIO FEDERAL AMAZONAS: Dept. Casiquiare, Río Guainía, alrededores de Maroa, alt. ca. 127 m., 6–19 Jul 1969 (fl), *G. S. Bunting et al. 3996* (MY, U); Dept. Río Negro: San Carlos de Río Negro, 17 Sept 1975 (st), *P. E. Berry 1345* (VEN); 1–2 km. southeast and east of San Carlos de Río Negro, ca. 20 km. south of confluence of Río Negro and Brazo Casiquiare, 1°56′ N., 67°03′ W., alt. 120 m., 22 Apr 1979 (st), *R. L. Liesner 6859* (F), 2 Mar 1979 (fl), *H. L. Clark 7107* (VEN), 8 Feb 1980 (fl), *H. L. Clark 7341* (VEN); km. 11 de la carretera San Carlos de Río Negro–Solano (área de estudio del I.V.I.C.), alt. ca. 120 m., 16 Sept 1980 (st), *O. Huber et al. 5672* (F, VEN), *5691* (F, VEN); Mari's bana, 10.8 km. northeast on Solano road, n.v. "palo de máguari," 19 Aug 1981 (fl, fr), *H. L. Clark 8127* (F), *8129* (F), *8130* (NY), *8131* (F); 22 Sept 1975 (fl), *P. E. Berry & E. Brünig 1482* (VEN); 4.3 km. north-northeast on Solano road, phenology transect, plant #133, n.v. "palo de máguari," 28 Sept 1978 (fr), *H. L. Clark 6825* (NY), 11 Dec 1980 (fr), *H. L. Clark & P. Maquirino 7781* (F). BRAZIL: AMAZONAS: Alto Rio Negro, Rio Uaupés, Taracuá, Quadra 2–4, n.v. "turí," Feb 1959 (st), *W. Rodrigues 1132* (INPA); Taracuá, Feb 1959 (st), *J. M. Pires et al. 7527* (IAN), 29 May 1962 (fl), *J. M. Pires & N. T. Silva 7910* (IAN, UB); Rio Uaupés, n.v. "coca de caatinga," 11 May 1942 (st), *R. Froes 12576/300* (A, 2 sheets).

ETYMOLOGY: From Greek, "hypoleukos," meaning "white beneath," referring to the conspicuously white lower surface of the leaves.

DISTRIBUTION: Known only from the upper Río Negro region of southern Venezuela and the Rio Uaupés of neighboring Brazil. One disjunct population is known from the summit of Cerro Guaiquinima in the State of Bolívar, Venezuela, some 550 km. to the northeast of the nearest populations in the Río Negro area.

ECOLOGY: *Erythroxylum hypoleucum* grows primarily in savanna-woodland formations on white sand soils known as "Amazonian caatinga" in Brazil and as "bana" in Venezuela: This area is classified according to the Holdrige Life Zone system as "tropical moist forest" and receives an average of 3400–3600 mm. of rainfall per year. However, because of the relatively poor white sand soils, the "caatinga" supports only a dwarf forest or savanna vegetation.

PHENOLOGY: *Erythroxylum hypoleucum* flowers between April and September; the fruits appear between August and December.

COMMON NAMES AND USES: At San Carlos de Río Negro, *E. hypoleucum* is known as "palo de máguari" or "máguari's tree." "Máguari" refers to a malevolent spirit known to local witch doctors, who apparently use the plant for medicinal or magical purposes (H. L. Clark, pers. comm.). The species also is called "cachito" or "palo gallineta" at San Carlos. "Gallineta" is a Venezuelan name for tinamous who probably eat the fruits of this tree. On the Rio Uaupés in Brazil, *E. hypoleucum* is called "turí."

RELATIONSHIPS: *Erythroxylum hypoleucum* is closely related to *E. lineolatum* DC. and probably has been derived from it. *Erythroxylum lineolatum* is an uncommon species with a scattered distribution across northern South America. It is known from the Cauca Valley in northwestern Colombia east to Trinidad and grows in a variety of habitats including dry scrublands, bush islands in savannas and moist cloud forest. *Erythroxylum hypoleucum* may be distinguished from *E. lineolatum* in having thicker branchlets (2–4 mm. vs. 1.5–2.0 mm. in diameter), more coriaceous leaves, and much thickened, shorter (0.3–0.8 vs. 2.0–5.0 mm. long) pedicels.

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PLATE 26

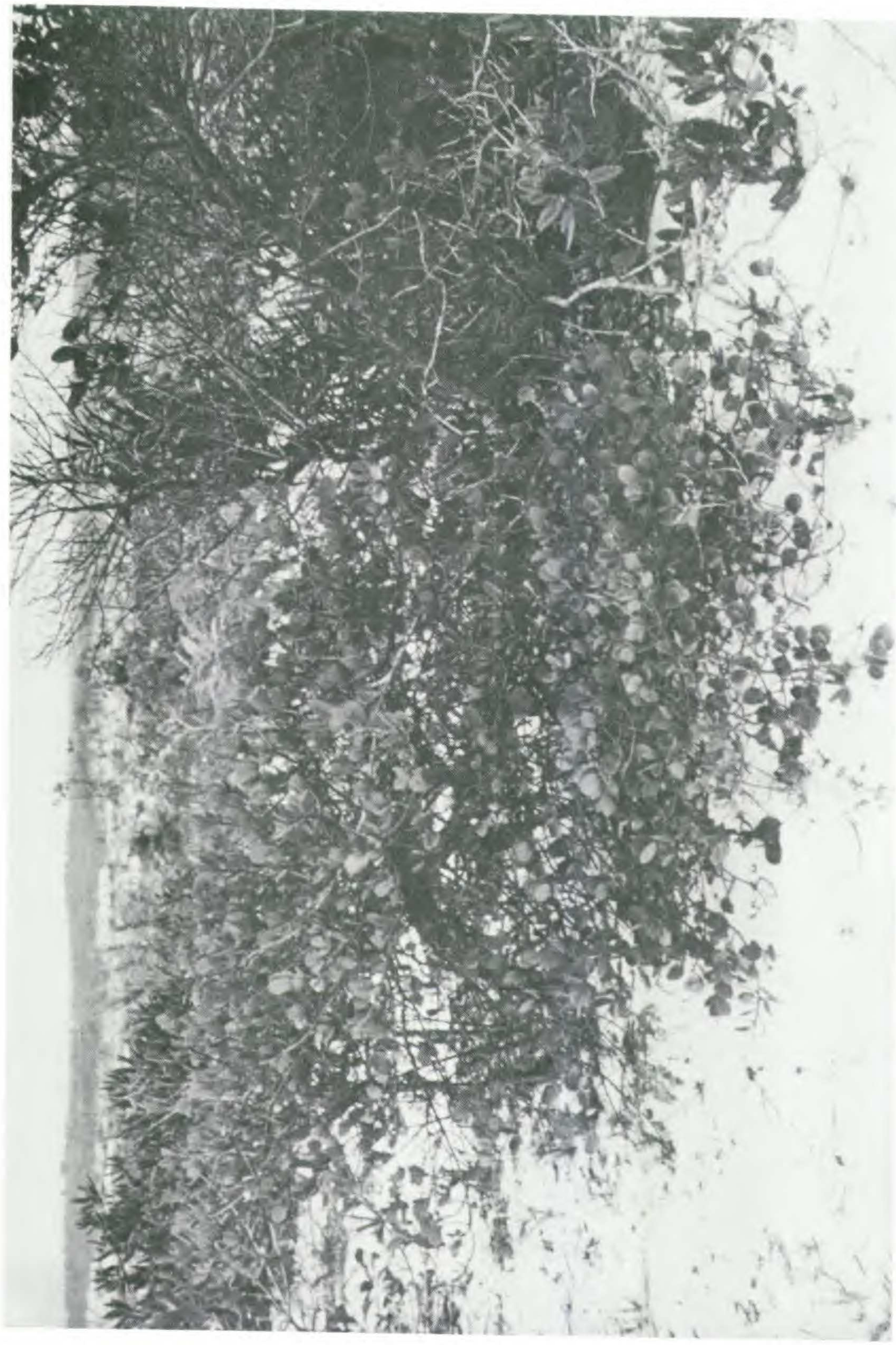

Plate 26. Dune scrub habitat and sprawling growth habit of young shrub of *Erythroxylum Leal-costae* Plowman *(Plowman 12780)* near Itapuã, Bahia, Brazil.

PLATE 27

Plate 27. Close-up showing bark on major basal branch of *Erythroxylum Leal-costae* Plowman *(Plowman 12770).*

PLATE 28

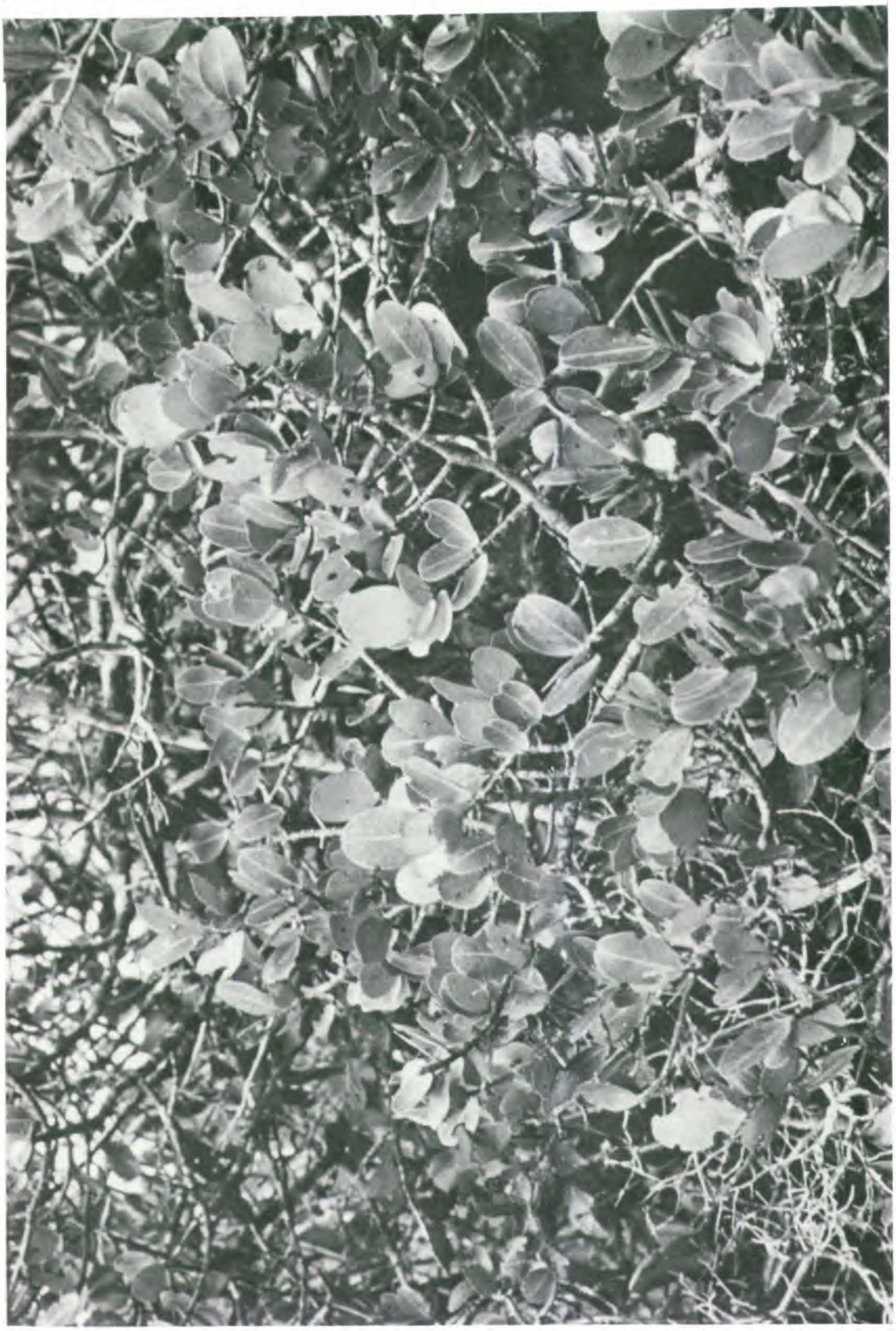

Plate 28. Densely branched habit of mature individual of *Erythroxylum Lealcostae* Plowman *(Plowman 12770).*

PLATE 29

Plate 29. Branching habit of *Erythroxylum occultum* Plowman, cultivated at Centro de Botânica, Alto de Boa Vista, Rio de Janeiro, Brazil *(Plowman 12952)*.

PLATE 30

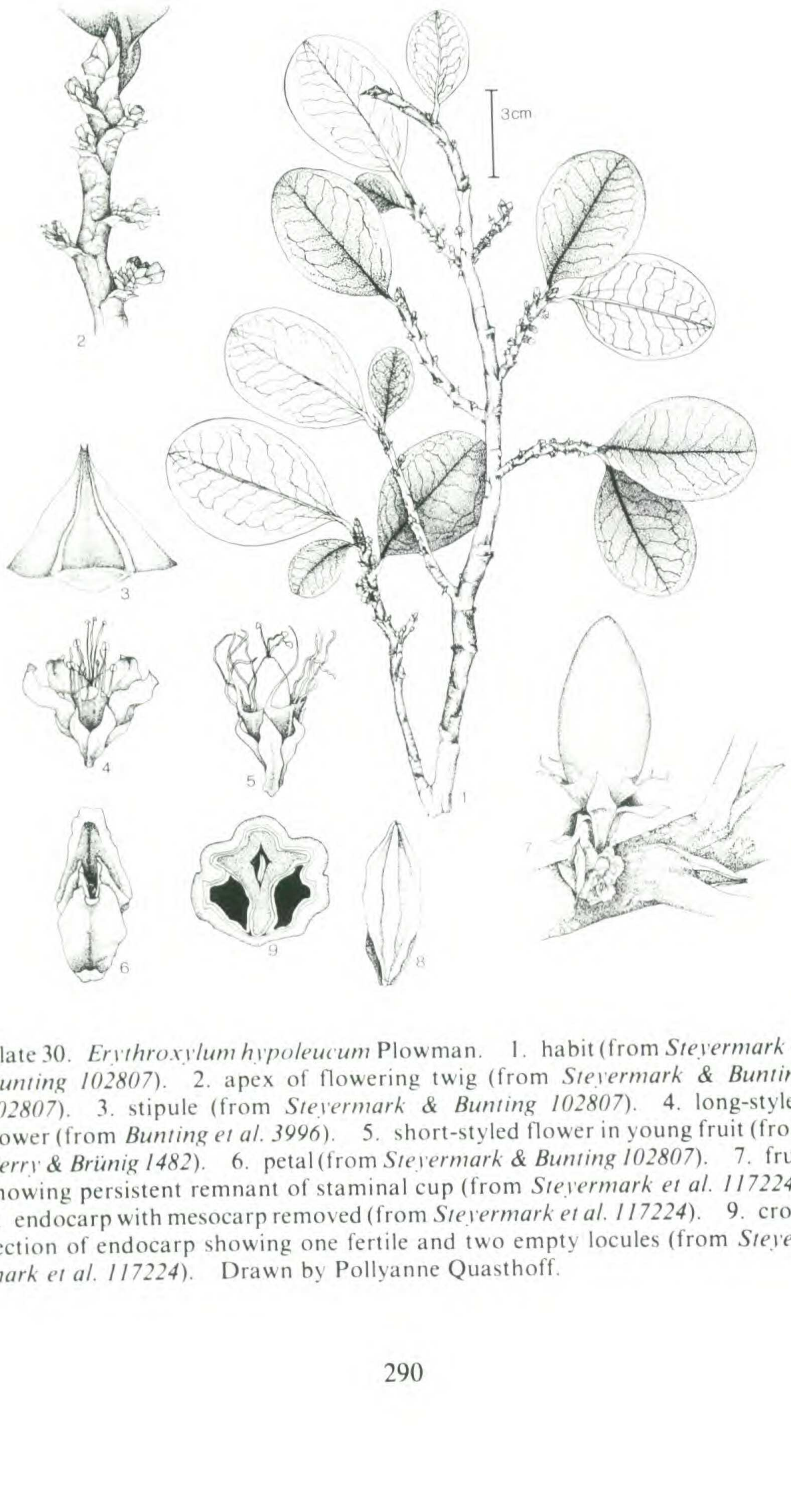

Plate 30. *Erythroxylum hypoleucum* Plowman. 1. habit (from *Steyermark & Bunting 102807*). 2. apex of flowering twig (from *Steyermark & Bunting 102807*). 3. stipule (from *Steyermark & Bunting 102807*). 4. long-styled flower (from *Bunting et al. 3996*). 5. short-styled flower in young fruit (from *Berry & Brünig 1482*). 6. petal (from *Steyermark & Bunting 102807*). 7. fruit showing persistent remnant of staminal cup (from *Steyermark et al. 117224*). 8. endocarp with mesocarp removed (from *Steyermark et al. 117224*). 9. cross section of endocarp showing one fertile and two empty locules (from *Steyermark et al. 117224*). Drawn by Pollyanne Quasthoff.